

# ABSTRACT OF THE DISCLOSURE

An apparatus and method to increase the output power from LiNbO<sub>3</sub> MZM style optical intensity modulating without exceeding the optical power damage threshold imposed by LiNbO<sub>3</sub> is described. The optical path from a laser source is divided into two paths by a polarization maintaining (PM) coupler. The two paths form a Mach Zender Modulator (MZM) with a LiNbO<sub>3</sub> phase modulator in one path and a fiber looped PZT in the other. The LiNbO<sub>3</sub> phase modulator imprints an RF signal onto one path of the MZM cavity, while the fiber wrapped PZT is used to control the path length difference between the two optical paths. The two optical paths are recombined in a second PM coupler. The second PM coupler and a 1-2% coupler are used to sample a small portion of the MZM output signal which is fed back to a phase locked loop (PLL) circuit for providing feedback voltage to the fiber wrapped PZT in the second arm of the MZM, and ensures the phase of the signals in the two arms of the MZM are matched to within a fraction of the laser linewidth. The present invention increases the amount of optical power by using a LiNbO<sub>3</sub> modulator within a fiber Mach-Zender cavity.